

REMARKS

Claims 1-37 are respectfully submitted for consideration. The Office Action, on the cover page thereof, indicated that only claims 1-33 were pending in this application. It is noted that claims 1-37 are submitted, and it is therefore respectfully requested that any future communications properly reflect the status of the claims.

Claims 1-3, 15-18 and 34 were rejected under 35 U.S.C. § 102(e) as being anticipated by Badt (United States Patent No. 6,496,476). Applicant respectfully traverses this rejection, and submit that each of the pending claims recite subject matter which is neither disclosed nor suggested in Badt '476.

Claim 1, upon which claims 15-18 and 34 are dependent, is directed to a method for establishing a protection path for a failed link between first and second nodes in a mesh network. A transfer of information from the first node to the second is disrupted by the failed link. The method comprises establishing an alternate path from the second node to the first node via a destination-to-source communication channel. The destination-to-source communication channel is established through one or more alternate nodes beginning at the first node and ending at the second node. A switch function is executed at each of the alternate nodes traversed by the destination-to-source communication channel to allow source-to-destination traffic flow from the first node to the second node along the alternate path defined by the destination-to-source communication channel. Information traffic flow is switched at the first node from the failed link to the alternate path when the destination-to-source communication channel is established at the first node.

As a result of the elements of claim 1, including the step of switching the information traffic flow, efficient and flexible routing within the network of protection fibers is provided, where there are multiple available routes in which the optical signal may travel.

Badt discloses a system and method for restricted reuse of intact portions of failed paths. The origin and destination of nodes of a failed path, according to Badt, are apprised of the portions of the path that remain intact by “reuse” messages sent from the custodial nodes that are adjacent to the failure. The node ID of the intermediate node is appended to a field of the message such that as the reuse messages are propagated along the intact portions of the failed path, an accumulated list of nodes that are encountered by the messages passing from the custodial node to the origin, and the destination nodes, is set forth. In particular, Figure 19 and columns 13-14 of Badt, discloses a sub-network 40 having an origin node 42, tandem nodes 44, 46, and a destination node 48. Badt also discloses that “[b]eginning at destination node 48...[a] return message flows on path 192 to tandem mode 46, and on path 190 to tandem node 186...[and that] the return message flows on path 76 to origin node 42. Also, from tandem node 186, a return message flows to origin node 42.” (column 13, lines 14-19).

Badt, however, fails to disclose or suggest the elements of claim 1, including at least the step of switching the information traffic flow at the first node from the failed link to the alternate path when the destination-to-source communication channel is established at the first node. Referring, for example to Figure 27 of Badt, it can be seen that, pursuant to the flow of return messages, multiple alternate paths are established for traffic between origin node 42 and destination node 48. Referring, for example to Figure 27 of Badt, origin node 42 forwards traffic to tandem node 46 and tandem node 186. This is significantly different to the single alternate path as recited by claim 1 and claims dependent thereupon.

Claims 36 and 37 were separately rejected under 35 U.S.C. § 102(e) as being anticipated by Azuma (United States Patent No. 6, 430,150). As will be discussed below, applicant respectfully submit that each of these claims recite subject matter which is neither disclosed nor suggested in the cited prior art.

Claim 36 is directed to a network node comprising a port configured to receive information from a destination-to-source communication link. A control circuit is operably connected to the port, and configured to a cross-connect section. The cross-connect section is operably connected to the control circuit, and is configured to direct network traffic flow between a first node and a second node. The control circuit is configured such that, upon receipt of the information from a destination-to-source communication link, the information identifying that a protection path for a failed link between the first and second node is to be established. The control circuit causes the cross-connect section to execute a switch function to allow source-to-destination information traffic flow along a path defined by the information received from the destination-to-source communication channel. Claim 37 is dependent upon claim 36, and further recites that the node is an optical WDM mesh network node.

Azuma is directed to a communication node, a restoration method, and a communication network. In particular, Azuma is directed to a telecommunication network wherein each node that receives information relating to the failure determines alternative paths for bypassing the failure. Azuma also discusses service being switched to the alternative paths. However, Azuma fails to disclose or suggest the subject matter of claims 36 and 37. Azuma fails to disclose or suggest at least the “port configured to receive information from a destination-to-source communication link, as recited in claim 36.

Claims 4-14 and 19-33 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Badt in view Azuma. The Office Action took the position that Badt disclosed all of the elements of the claimed invention, with the exception of optically switching the wavelengths of one or more of the optical paths of the failed link onto optical fibers establishing the alternate path. The Office Action took the position that Azuma cured this deficiency in Badt by executing a switch function comprising optically switching the wavelengths of the optical signals of the failed link onto optical fibers, establishing the alternate paths. The Office Action then took the position that it would have been obvious to a person of ordinary skill in the art to combine these references to yield the claimed invention. Applicant respectfully traverses this rejection, and respectfully submits that claims 4-14 recites subject matter which is neither disclosed nor suggested in the cited prior art.

Claim 4 is dependent upon claim 3 which is dependent upon claim 2, and therefore dependent upon claim 1. Claim 4 therefore recites, in addition to the elements of claim 1, that the mesh network is an optical mesh network, with the optical mesh network incorporating wavelength division multiplexing, whereby multiple optical signals are each transmitted at a different wavelength on a single optical fiber, and wherein a switch function comprises optically switching the wavelengths of one or more of the optical signals of the failed link onto optical fibers establishing the alternate path. As discussed above with respect to claim 1, Badt fails to disclose or suggest at least a step of switching the information traffic flow at the first node from the failed link to the alternate path when the destination-to-source communication channel is established at the first node. Furthermore, Azuma fails to cure the deficiencies of Badt with respect to claim 1, and also fails to cure the deficiencies of Badt with respect to claims 4-14 and 19-33.

As noted above, Azuma is directed to a communication node, a restoration method, and a communication network. It is important to note, both with respect to Badt and with respect to Azuma, that neither of these references are directed to optical networks. The Office Action seems to take the position that the "non-optical" networks disclosed in these references are equivalent to an optical network. However, it should be noted that the fact that neither Badt nor Azuma mentions optical networks is a significant fact. Typically, optical networks have considerably higher data rates, which therefore significantly increases complexities associated with data buffering, such as in cases of link failure. Furthermore, as discussed above and as will be discussed below, these references simply do not, either singly or in combination, disclose or suggest the subject matter of the present claims. Neither Badt nor Azuma can be interpreted as disclosing or suggesting switching information traffic flow at a first node from a failed link to an alternate path when a destination-to-source communication channel is established at the first node.

Independent claim 22 is directed to a network protection configuration for use in optical network topologies to reroute optical signals from a failed transmission path to one or more alternate transmission paths. The network protection configuration comprises an optical fiber network comprising a plurality of optical network nodes each coupled to transmit and receive optical signals carried on distinct wavelengths on optical fibers of the optical fiber network. The optical network further comprises a source node attempting to transmit the optical signals via the failed transmission path, and a destination node detecting the failed transmission path. A communication channel is established from the destination node to the source node to transmit a path failure notification. A route established by the destination-to-source communication channel, traversing one or more of the optical network nodes, defines the alternate transmission

path. The network nodes defining the alternate transmission path are switched in response to the path failure notification to facilitate source-to-destination transmission of the optical signals from the failed transmission path along the alternate path. Claims 23-31 are dependent upon claim 22.

Independent claim 32 is directed to a network protection configuration for use in optical network topologies to reroute optical signals from a failed transmission path to one or more alternate transmission paths. The network protection configuration comprises an optical fiber network comprising a plurality of optical network nodes, each coupled to transmit and receive optical signals carried on distinct wavelengths on optical fibers of the optical fiber network. Each of the plurality of optical network nodes comprises a fiber cross-connect circuit coupled to receive one or more of the optical fibers of the optical fiber network, and to switch the optical signals on the optical fibers to particular output ports of the fiber cross-connect to route the optical signals on the optical fibers to targeted optical fibers. An optical cross-connect circuit is coupled to receive one or more of the optical signals and to switch the optical signals to particular output ports of the optical cross connect to route the optical signals to targeted ones of the optical fibers. A Destination-to-source communication channel is established from a destination node detecting the failed transmission path from a source node to transmit a failed path notification. A route established by the destination-to-source communication channel traverses one or more of the optical network nodes, thereby defining the alternate transmission path. The fiber cross-connect and optical cross-connect circuits of the network defining the alternate transmission path are switched in response to the failed path notification to facilitate source-to-destination transmission of the optical signals from the failed transmission path along the alternate path.

Independent claim 33 is directed to a method for establishing a protection path for a failed optical link between a source node and a destination node in an optical WDM mesh network. Claim 33 recites a detecting step, a transmitting step, and a configuring step. A switching step comprises switching suspended optical signals from the failed optical link to the source-to-destination protection path upon receipt of the link failure signal at the source node. The source-to-destination protection path is set up using a destination-to-source communication channel. As a preliminary matter, it should be noted that independent claims 22 and 33, and claims dependent thereupon are all directed to configurations in optical networks. Neither Badt nor Azuma are directed to optical networks, and therefore are not directed to a system utilizing the high bandwidth and therefore buffering issues which are addressed by the present invention. Badt and Azuma, when viewed either singly or in combination, simply do not disclose or suggest the elements of the claimed invention, and therefore cannot recover sufficiently rapidly from a link failure in order to prevent significant data loss.

Furthermore, the Office Action takes the position that Azuma specifically disclosed an aspect of these claims, particularly that a route established by the destination-to-source communication channel traversing one or more of the optical network nodes defines the alternate transmission path, and also takes the position that the network nodes defining the alternate transmission paths are switched in response to the path failure notification to facilitate the source-to-destination transmission of the optical signals from the failed transmission path along the alternate path. Applicant respectfully submits, however, that Azuma does not in fact disclose this subject matter. Referring to column 2, lines 11-54 (cited in the Office Action), a person of skill in the art would understand Azuma to disclose information about a failure in the telecommunication network being transmitted throughout the network. Additionally, Azuma

discloses that alternate paths are determined using information about the network topology, etc. Azuma then explains that services are switched to the alternate paths. Therefore, it would be clear to a person of skill in the art that the route in Azuma, or the alternate path, is not defined by the destination-to-source communication channel, as recited in the presently pending claims. The present application discloses and the claims clearly recite that the alternate route is established in a destination-to-source manner. Therefore, at the time when the source node receives information about the failure, the alternate path has already been configured. This is a significant distinction which makes the present invention much more efficient in setting up alternate paths. This same significant distinction exists with respect to all of the presently pending claims.

Claim 35 is dependent upon claim 33, and further recites that the link failure signal is transmitted from the destination node through one or more alternate nodes, with the link failure signal directing the alternate nodes to perform an appropriate switching function such that the source-to-destination protection path is set up by the time that the link failure signal reaches the source node. In addition to the distinction between the claims and Azuma as discussed above, it is respectfully submitted that Badt discloses a significantly different configuration. In Badt, specifically column 13, lines 13-58, the alternate path is disclosed as being established during the "return phase," when the return message is sent from the destination node to the source node through tandem nodes. However, according to Badt, the return phase is preceded by an "explorer phase," when an explorer message is sent from the source node to the destination node through tandem nodes to explore the available resources. This is a significantly different configuration from that which is disclosed in claim 35, and claim 35 should therefore be found to

be allowable for these reasons, in addition to the reasons discussed above with respect to claim 33.

Finally, it is significant to note that a person of skill in the art would not seek to combine Badt with Azuma as suggested in the Office Action. Applicant respectfully submits that there is not motivation in the art to combine these references in any way to yield the claimed invention. Such a motivation or an indication of desirability of a proposed combination is required by MPEP § 2143.01 in order to establish a prima facie case of obviousness. The Office Action alleged, on page 5 thereof, that a person of ordinary skill in the art would have been motivated to combine the teachings of Azuma with the teachings of Badt since switching allows the system to reroute the “optical” signals from the service path to the alternate path in the event of a fault on the link, or a link failure. As a preliminary matter, and as mentioned previously, there is disclosure or suggestion in Azuma or Badt that they are for use with an optical network. Furthermore, both Azuma and Badt disclose different ways of achieving an alternate path in the case of a link failure. These ways are both different from the claimed invention, and there is no motivation in the art to combine or modify these references in any way to yield the claimed invention. The only disclosure or suggestion of the present invention is provided in the applicants own disclosure, and it is improper to look to an applicants disclosure for any motivation to modify or combine prior art references (*Interconnect Planning Corporation v. Feil*, 227 U.S.P.Q. 543 (Fed. Cir. 1985), *Symbol Technologies v. Opticon Inc.*, 19 U.S.P.Q. 2d 1241 (Fed. Cir. 1991), *In Re Rothermel and Waddell*, 125 U.S.P.Q. 328 (CCPA 1960), *In Re Jones*, 21 U.S.P.Q. 2d 1941 (Fed. Cir. 1992)).


In view of the above, applicant respectfully submits that each of presently pending claims 1-37 recite subject matter which is neither disclosed nor suggested in the cited prior art.

Applicant submits that this subject matter is more than sufficient unobvious to a person of ordinary skill in the art. Applicant therefore respectfully requests that claims 1-37 be found allowable, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants undersigned representative at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,


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